

# PATENT ABSTRACTS OF JAPAN

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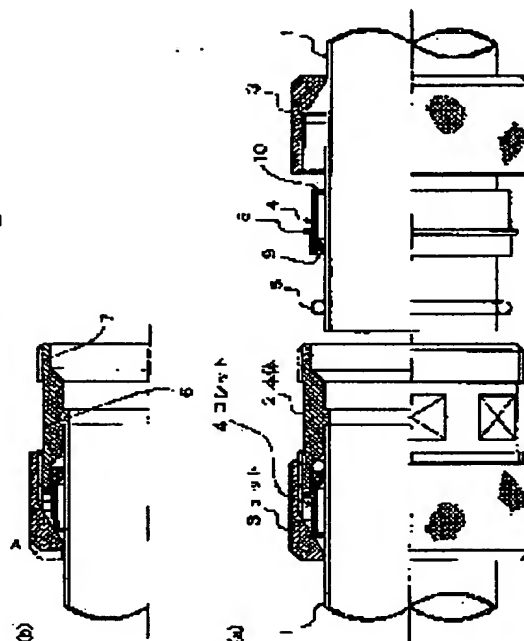
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## (54) PIPE JOINT

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a pipe joint low in flow passage resistance, easy to tighten and disassemble and capable of connecting thin pipes.

**SOLUTION:** When an O-ring 5 and one end of a collet 4 are inserted into a stepped portion 7 of a body 2, a gap is formed between the end face of the body 2 and a protrusion 8 on the outer periphery portion of the collet 4. When the collet 4 is tightened with a nut 3, until both end faces contact each other, a preset sealing pressure is obtained by the O-ring 5. When the nut 3 is further tightened to a preset position, a claw provided on the inner periphery portion of the collet 4 is bitten into a pipe 1 to produce a predetermined connection force.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] The body (2) with which tubing (1) is inserted in the bore section, and the nut screwed in the edge of the outer-diameter section of this body (2) (3), The annular collet which an end is inserted in the level difference section (7) formed in the edge of the bore section of this body (2), and is pressed with a nut (3) (4), It consists of an O ring (5) prepared at the tip of this collet (4). In the bore section of said body (2) The pars basilaris ossis occipitalis of the level difference section (7) which the annular projection (6) which has the bore of tubing (1) and the bore of abbreviation identitas was formed, and was formed in the edge of this bore section is made into the inclined plane. In the outer-diameter section of said collet (4) An annular projection (8) is formed. In the both ends of the bore section of a collet (4) The annular projection (9 10) which has the same bore is formed, respectively. the outer diameter of tubing (1), and abbreviation — The pawl is formed at the tip of the projection by the side of a nut (10). The projection (8) of the outer-diameter section of said collet (4) When the end of an O ring (5) and a collet (4) is inserted in the level difference section (7) of a body (2), The pipe joint characterized by being prepared in the location which predetermined seal \*\* produces with an O ring (5) when a skimmer is formed between the end face of a body (2), and the end face of a projection (8) of the outer-diameter section of a collet (4), a collet (4) is bound tight with a nut (3) and a both-ends side is contacted.

[Claim 2] The pipe joint according to claim 1 characterized by forming the inclined plane which tubing (1) Makes the hole bottom section of said nut (3) hard [ the pawl which the edge of a collet (4) was pressed, and the nut side of a collet (4) was sagged, and was prepared in the collet (4) ].

[Claim 3] The pipe joint according to claim 1 or 2 characterized by forming two or more slits in the nut side of said collet (4).

[Claim 4] The pipe joint according to claim 1, 2, or 3 characterized by preparing the mark which can view the bolting location of said nut (3) in a body (2).

[Claim 5] A pipe joint given in any 1 term of claims 1-4 to which said pipe joint is characterized by being the pipe joint of a union format.

[Claim 6] The elbow which comes to weld a pipe joint given in any 1 term of claims 1-4 to a bend (11).

[Claim 7] The header which comes to weld a pipe joint given in any 1 term of claims 1-4 to a cylindrical (13) side attachment wall.

[Claim 8] The cheese head with which it comes to weld a pipe joint given in any 1 term of claims 1-4 to T type tubing.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pipe joint used for piping of a low voltage application like piping which supplies a coolant, water, Ayr, etc. to the cutting section of a machine tool especially about a pipe joint.

[0002]

[Description of the Prior Art] In recent years, in all fields, energy saving serves as an important theme, and it is not an exception in a machine tool. The rate of the consumption power of the feed pump of the coolant occupied for the total consumption power of a machine tool is very as large as 20 - 40%. Moreover, energy saving including piping of the pipe line which supplies not only consumption power but a coolant etc., the cost of a pipe joint, piping installation cost, etc. of the whole machine tool, and saving resources are important.

[0003] conventionally, SGP tubing adopts it as a coolant and piping for Ayr — having — a pipe joint — a screwed joint — it puts and the lump joint is adopted.

[0004] Construction of piping using a screwed joint processes a taper screw thread on the edge of SGP tubing, winds a seal tape around the front face, and is performed by thrusting \*\*\*\* \*. Moreover, it puts, and construction of piping using a lump joint is put in the edge of SGP tubing, and is performed by inserting and welding a lump joint.

[0005]

[Problem(s) to be Solved by the Invention] Since SGP tubing is stuffed at the taper screw thread of a screwed joint while construction of piping takes time and effort in the case of piping using a screwed joint, as mentioned above, there is a problem that the end face of SGP tubing is located in passage, and passage resistance becomes large. Moreover, in order to prevent this since the joint of another side loosens if one joint is fastened, and in order to make decomposition of piping easy, it is necessary to prepare a union.

[0006] It puts, in the case of piping using a lump joint, piping and a pipe joint must be welded, and when decomposing piping, there is a problem that piping must be cut.

[0007] Moreover, only in the part, thickness becomes thick in order that SGP tubing may process \*\*\*\* on an edge. Usually, since a coolant and the supply pressure of Ayr are 1 or less MPa, they have the problem of being too thick, with SGP tubing.

[0008] The passage resistance of this invention is small, and - decomposition with a bundle is easy for it, and it makes it a technical problem to offer the pipe joint which can connect a thin wall tube.

[0009]

[Means for Solving the Problem] The nut with which the pipe joint by this invention is screwed in the edge of the outer-diameter section of the body with which tubing is inserted in the bore section,

and this body, It consists of an annular collet which an end is inserted in the level difference section formed in the edge of the bore section of this body, and is pressed with a nut, and an O ring prepared at the tip of this collet. In the bore section of said body The pars basilaris ossis occipitalis of the level difference section which the annular projection which has the bore of tubing and the bore of abbreviation identitas was formed, among these was formed in the edge of a diameter is made into the inclined plane. In the outer-diameter section of said collet An annular projection is formed. In the both ends of the bore section of a collet The annular projection which has the same bore is formed, respectively, and the pawl is formed at the tip of the projection by the side of a nut. the outer diameter of tubing, and abbreviation — the projection of the outer-diameter section of said collet When the end of an O ring and a collet is inserted in the level difference section of a body, a skimmer is formed between the end face of a body, and the end face of a projection of the outer-diameter section of a collet, a collet is bound tight with a nut and a both-ends side is contacted, It is characterized by being prepared in the location which predetermined seal \*\* produces with an O ring.

[0010]

[Embodiment of the Invention] The gestalt of operation of this invention is explained with reference to a drawing based on an example.

[0011] Drawing 1 is the block diagram of the pipe joint of one example of this invention, (a) shows a decomposition condition and a set condition and (b) shows the bolting condition.

[0012] The pipe joint of this example is a union format, and consists of the body 2 with which the tubing 1 of thin meat is inserted in the bore section, a nut 3 screwed in the both ends of the outer-diameter section of this body 2, an annular collet 4 which an end is inserted in the both ends of the bore section of this body 2, and is pressed with a nut 3, and O ring 5 prepared at the tip of both the collets 4, respectively.

[0013] The annular projection 6 which has the bore of tubing 1 and the bore of abbreviation identitas is formed in the bore section of said body 2. The both-ends side of this projection 6 is used as the right angle to the axis. The level difference section 7 is formed in the edge of the bore section, and let the pars basilaris ossis occipitalis be an inclined plane. A male screw is formed in the both ends of the outer-diameter section of said body 2, and the center section is made into the shape of 6 square shapes so that it can hold with a spanner etc.

[0014] the annular projection 8 forms in the outer-diameter section of said collet 4 — having — the both ends of the bore section of a collet 4 — the outer diameter of tubing 1, and abbreviation — the annular projections 9 and 10 which have the same bore are formed, respectively. The projection 10 by the side of a nut is made thinner than the thickness of the projection 9 by the side of a body, and the cutting edge (pawl) which inclined in the body side is formed at the tip.

[0015] a collet 4 — from a nut side — etc. — it is cut until two or more slits (not shown) result in the projection 9 by the side of the body of the bore section at \*\*. In addition, the nut side is made longer [ than the projection 8 of the outer-diameter section ] than a body side.

[0016] As shown in drawing 1 (a), when the projection 8 of the outer-diameter section of a collet 4 inserts the end of O ring 5 and a collet 4 in the level difference section 7 of a body 2, A skimmer is formed between the end face of a body 2, and the end face of the projection 8 of the outer-diameter section of a collet, and as shown in drawing 1 (b), when binding a collet 4 tight with a nut 3 and contacting a both-ends side, it is prepared in the location which predetermined seal \*\* produces with O ring 5.

[0017] The hole bottom section of said nut 3 is made into an inclined plane, and it is made to have the edge of a collet 4 pressed in this inclined plane. In addition, the outer-diameter section of a nut 3 is made cylindrical, and knurling tool credit is made if needed. Thereby, a nut 3 can be rotated by any wrenches.

[0018] Next, the assembly point of the above-mentioned pipe joint is explained.

[0019] As shown in the drawing 1 (a) Nakamigi side, it inserts in the tubing 1 of thin meat in order of

a nut 3, a collet 4, and O ring 5. Next, as shown in the left-hand side in drawing 1 (a), tubing 1 is inserted in the end face of the projection 6 formed in the bore section of a body 2. Then, a nut 3 is thrust into a body 2, and a collet 4 is moved to shaft orientations and it is made for O ring 5 to hit the inclined plane of the level difference section 7 of a body 2 in the inclined plane of a nut 3. In this condition, the skimmer is formed between the end face of a body 2, and the end face of the projection 8 of a collet 4.

[0020] Furthermore, if a nut 3 is rotated with a spanner etc., as shown in drawing 1 R> 1 (b), a both-ends side will contact. In this condition, O ring 5 deforms in the shape of a wedge, and predetermined seal \*\* produces it between tubing 1 and the inclined plane of a body 2.

[0021] Furthermore, when a nut 3 is rotated and a collet 4 is pressed, the nut side of a collet 4 bends in a tubeside by a slit etc., and the pawl of the projection 10 by the side of the bore of a collet 4 is hard tubing 1. A nut 3 is bound tight until it comes to the location of a mark established in the body 2. It is made to have rotated it in this example, as shown in drawing 1 (b) until the body side edge side of a nut 3 covers the male screw of a body 2. In this condition, tubing 1 is certainly connected to a pipe joint by the pawl.

[0022] Since the pipe joint by this invention does not almost have passage resistance, it can make the pressure loss of the pipe line of a coolant small.

[0023] For example, when 50A (2") and 32A (1 1/4") tubing were used for piping of the coolant using a screwed joint, pressure losses were 0.2MPa(s), but when the pipe joint of this invention was used, with the former tubing, it was set to 0.13MPa with tubing of 0.08MPa and the latter.

[0024] Moreover, in the pipe joint by this invention, since a seal function and the connect function of tubing can be separated and seal \*\* and the connection force can be made into a predetermined value, respectively, a thin wall tube is also connectable satisfactory.

[0025] In this example, 32A (1 1/4") and tubing with a thickness of 1.5mm were used. In addition, the thickness of SGP tubing of 32A (1 1/4") is 3.5mm. When the nut 3 was rotated from the set condition of drawing 1 (a) until it considered as the bolting condition of drawing 1 (b), the nut 3 moved to shaft orientations 2.5mm. Thereby, even if it gave the internal pressure of 1MPa to tubing, connection of a seal and tubing was made certainly. Moreover, it became clear for this pipe joint to have been connected if the outer diameter of tubing is less than \*\*0.5mm.

[0026] In addition, if the pile lump joint currently used for oil pressure is used for connection of tubing of thin meat, since tubing which a ferrule connects is made to transform, a ferrule is not hard tubing and connection of a seal and tubing cannot be ensured.

[0027] In the example mentioned above, although the pipe joint of a union format was explained, as shown in drawing 2, the end of the body 2 of the pipe joint mentioned above can be welded to the both ends 11 of a bend, and it can also consider as an elbow 12. In this elbow 12, since radius of curvature can be conventionally enlarged compared with an elbow, a pressure loss can be made small. Moreover, as shown in drawing 3, the end of the body 2 of the pipe joint mentioned above on the side attachment wall of the cylinder 13 with which the a large number boss is prepared can be welded, and it can also consider as a header 14. In addition, although not illustrated, the end of the body 2 of the pipe joint mentioned above can be welded to the edge of T type tubing, and it can also consider as a cheese head.

[0028]

[Effect of the Invention] Since this invention is constituted as explained above, it can acquire the following effectiveness.

- (a) Don't need 2nd order-processing of chasing for piping, welding, flare, etc.
- (b) The thin wall tube according to working pressure can be used for screw cutter needlessness.
- (c) Dependability [ as opposed to leakage by the software seal device ] is high.
- (d) Since there are few pressure losses, consumption power of feed pumps, such as a coolant, can be made small.
- (e) Piping, the cost of a pipe joint, and piping installation cost are reducible.